

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
31 December 2003 (31.12.2003)

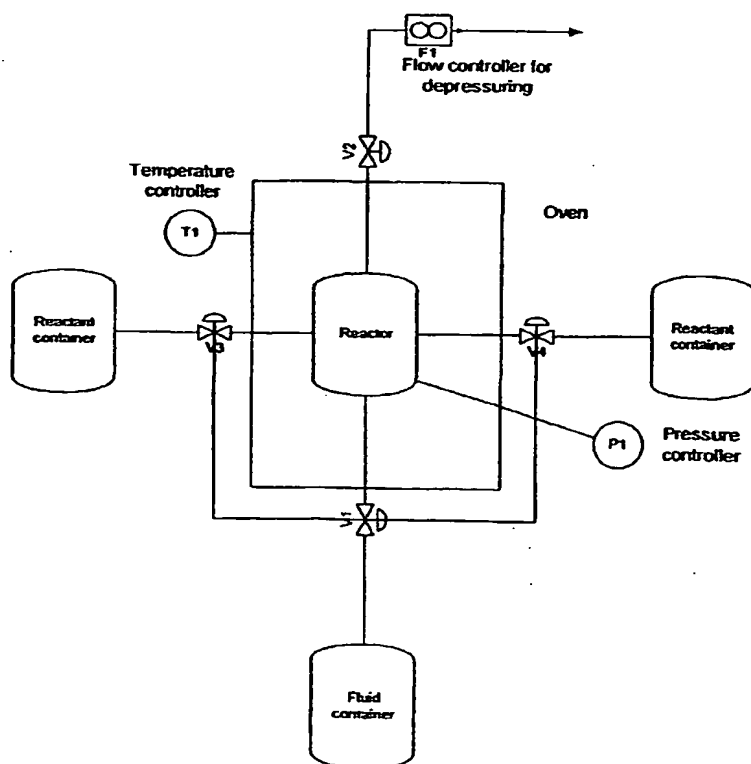
PCT

(10) International Publication Number  
**WO 2004/001278 A2**

- (51) International Patent Classification<sup>7</sup>: F16M (DK). SØGAARD, Erik, Gydesen [DK/DK]; Kirkegade 172, DK-6700 Esbjerg (DK).
- (21) International Application Number: PCT/DK2003/000439 (74) Agent: PLOUGMANN & VINGTOFT A/S; Sundkrogs-  
gade 9, Post Office Box 831, DK-2100 Copenhagen Ø (DK).
- (22) International Filing Date: 25 June 2003 (25.06.2003) (81) Designated States (*national*): AE, AG, AL, AM, AT (util-  
ity model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,  
(25) Filing Language: English CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (util-  
ity model), DE, DK (utility model), DK, DM, DZ, EC, EE  
(26) Publication Language: English (utility model), EE, ES, FI (utility model), FI, GB, GD, GE,  
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,  
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN,  
MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO,  
(30) Priority Data: PA 2002 00975 25 June 2002 (25.06.2002) DK RU, SC, SD, SE, SG, SK (utility model), SK, SL, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.
- (71) Applicant (*for all designated States except US*): AAL-  
BORG UNIVERSITET [DK/DK]; Fredrik Bajers Vej 5,  
DK-9220 Aalborg Ø (DK).
- (72) Inventors; and (84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
(75) Inventors/Applicants (*for US only*): JENSEN, Henrik Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
[DK/DK]; Spangsbjerg Kirkevej\_50,3.3, DK-6700 Esbjerg

[Continued on next page]

(54) Title: METHOD FOR PRODUCTION OF A PRODUCT HAVING SUB-MICRON PRIMARY PARTICLE SIZE, PRODUCT PRODUCED BY THE METHOD AND APPARATUS FOR USE OF THE METHOD



(57) Abstract: The invention relates to a method of manufacturing a product having a sub-micron primary particle size such as metal oxide, metal oxidhydroxide or metal hydroxide product, said method comprising the steps of: introducing a solid reactor filling material in a reactor, introducing a metal-containing precursor in said reactor, introducing a co-solvent into the said reactor, introducing a supercritical solvent in the said reactor. By these steps a contact between the metal-containing precursor and the co-solvent is established, thus resulting in the formation of said product in the proximity of the said solid reactor filling material. The present invention offers the astonishing possibility of producing anatase phase of TiO<sub>2</sub> at temperatures as low as between 50°C and 100°C and at concurrent pressures of 100-200 bar. The invention also relates to a product such as anatase TiO<sub>2</sub> produced by the method and also relates to an apparatus utilising the method.

WO 2004/001278 A2